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REMARKS

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Consideration and allowance of this application are respectfully requested.

By this Amendment, claims 4, 26 and 48 have been canceled and claims 1, 2, 3, 16, 23, 24, 25, 38, and 45 have been amended. New claims 66-70 have been added. No new matter has been added by these amendments.

Claims 59-65 were previously canceled.

Claims 1-3, 5-25, 27-47, 49-58, and 66-70 are pending in this application.

A.   CLAIM REJECTIONS UNDER 35 U.S.C. §101

The Examiner rejected claims 23 and 38 under 35 U.S.C. §101 as being directed to computer program code. The Examiner also rejected dependent claims 24-37 and 39-44 under 35 U.S.C. §101 by virtue of their dependence on claims 23 and 38.

The claims have been amended, as suggested by the Examiner, to software that is embodied on computer-readable storage media. Specifically, claims 23 and 38 have been amended to recite: "[a] computer program product <u>embodied on</u> computer-readable media ..." Applicant respectfully submits that these claims are directed to statutory subject matter under §101.

The Examiner requested that Applicant amend the specification on page 30, paragraph 66 by deleting the phrase "carrier wave" as "being an example of program product or storage device, because inclusion of 'carrier wave' in the specification would make the claim language of independent claims 23 & 38 non-statutory." *Office Action of 01/21/09*, pg. 2. Applicant respectfully disagrees, and respectfully submits that the claims, as written, are directed to statutory subject matter under §101, and that there is no need to amend the specification.

The Examiner is respectfully reminded that although the pending claims must be given their broadest reasonable interpretation during patent examination, the broadest reasonable interpretation of the claims must be consistent with the

interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d
1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

In view of the above, withdrawal of this rejection under §101 is respectfully
requested.

B.   THE PRIOR ART REJECTIONS

In the *Office Action of 01/21/09*, the Examiner rejected claims 1-58 under
35 U.S.C. §103(a) as being unpatentable over Jungck (U.S. Pub. No.
2005/0021863 – hereinafter "**Jungck**") and Sim (U.S. Pub. No. 2003/0031176 –
hereinafter "**Sim**").

The grounds for this rejection are respectfully requested.

As recited in **claim 1** and its dependents, a request from a client for an
object is directed to a particular edge server site in a network. The claimed
invention deals with the case where the particular edge server site does <u>not</u> have
the request object. In that case, the particular edge server site redirects the client
request to a first *caching* server site and conditionally replicates the requested
object. The claims have been amended to clarify that the conditional replication of
the requested object on the particular edge server site occurs <u>even though "the</u>
<u>requested object is served to the client from a caching server site other than the</u>
<u>particular edge server site</u>." Note that the caching server site that serves the object
to the client need not be the same as the first caching server site to which the
request was redirected. In other words, the edge server that received the client
request for the object (a) does not serve the requested object, and (b) conditionally
replicates the requested object. The claims require that the conditional
"replicating being based at least in part on a *dynamic* measure of popularity of the
requested object." This novel approach allows an edge server to prepare itself for
future requests for potentially popular objects, even though it is unable to handle
the current request. Since an object may not be considered popular (by the

dynamic measure of popularity), it may (or may not) be replicated on the edge server.

Claims **16, 23,** and **38** have been similarly amended, to clarify that "the requested object is served to the client from a caching server site other than the particular edge server site." System claim **45** has been amended to clarify that "if the edge server site does not have the requested object <u>and the object is served to the client from a caching server site other than the edge server site</u>, then the requested object is conditionally replicated on the edge server site, said replicating being based at least in part on a dynamic measure of popularity of the requested object." Note that the caching server site that serves the object to the client need not be the same as the first caching server site to which the request was redirected.

These claimed features are not found or in any way suggested by Jungck or Sim, alone or in any proposed combination.

In **Jungck,** <u>all</u> client requests are handled by cache servers 208 (Jungck ¶0057), and *all* requested content is <u>*unconditionally*</u> cached. These cache servers intercept client requests and attempt to service them. *Id.* When a cache server does not have the requested content (a so-called "miss"), the cache forwards the request on to the content source which forwards the content to the client through the cache server (possibly acting as a proxy server). *Id.* "[T]he cache server 208 [then] saves a copy of the content in its cache for later requests." *Id.* Unconditional caching has serious disadvantages discussed in the application as filed an in Applicant's earlier responses (caching large and infrequently requested objects is very inefficient).

Thus, as taught by Jungck, *all* requested content is (a) served by the cache server at which the client made the request, and (b) <u>*unconditionally*</u> cached. In both of these aspects, Jungck differs from the claimed invention (where (i) the requested content is served from a location (caching server site) other than that at

which the request was made; and (ii) even though it is not being served from the location at which the client request was made, the content is conditionally cached at that location.)

The Examiner acknowledged that "Jungck did not explicitly disclose if the edge server site does not have the requested object, conditionally replicating the requested object to the edge server site from the parent server site in the network, said replicating being based at least in part on a dynamically [*sic*] measure of popularity of the requested object." *Office Action of* 01/21/09, §8, pg. 3. Applicant agrees, noting however, that Jungck did not *implicitly* disclose popularity-based replication either.

The Examiner then applies **Sim**, supposedly to teach "if the edge server site does not have the requested object, conditionally replicating … the requested object to the edge server site from the parent server site in the network (paragraph. 138), said replicating being based at least in part on a dynamically measure of popularity of the requested object (paragraphs. 47 & 52)" *Id.*

Applicant respectfully submits that the Examiner has mis-construed the various components of Sim. Sim describes and distinguishes four components or entities operating in his system. In Sim, an End-User Client (EUC) requests content from an Application Servers (AS) at which the request was made, and all content is served to the requesting client from the application server (AS). (Sim Fig. 5 and related description). Separate and apart from the content being served to the end users, Sim describes how Content Provider Client (CPC) systems 530 publish their content to the application servers 560 via one or more Content Management Servers (CMS) 570. (¶¶0082 *et seq.*) In Sim, the manner in which content is propagated from the content providers (CPC) to the content management servers is independent of the manner in which content is served.

And in Sim, as with Jungck, *all* requested content is served by the server [Application Sever (AS) 560] at which the client made the request. However, in

Sim content that is served is *not* cached at the server that serves it. Instead, a so-called Virtual file control system (VCFS) server is used to make it appear to a requesting client that the content is present at the application server. (*Sim* ¶¶0047-48; see also "Each node at the edge of the network ... is configured to appear as if it has the large payload stored locally when portions of the file are really stored in on other nodes located throughout the network. ... When the end-user system issues a request for content (e.g., a large payload) the request is routed to the nearest node and the system delivers the requested content to the node in manner that maximizes data transfer efficiency while minimizing bandwidth consumption. The end result is that each network node has access to numerous large data files without having to store each of those data files locally." *Id.* ¶0080.)

More specifically, in Sim, the user always gets served from the same application server at which the request was made. (See ¶0047) If the application server does not have all of the requested data, it obtains it while it is downloading what it already has to the user. *Id.* ("since only selective portions of the large payload file may actually be resident at that node's storage at the time of request, the distribution stations may download the non-resident portions of the file as the application server is servicing the user")

In Sim, large files (not all content) may be replicated at nodes at the edge of the network. *Sim* ¶0047. However, this replication is made by a content provider in advance of any use of or request for the object, based, *e.g.*, on an initial *static* assessment of the objects popularity. *Id.* Thus, in *Sim*, if a content provider believes that certain objects will be popular, those are *unconditionally* replicated to the edge servers. This is akin to the prior art described in the present application (described, *e.g.*, at ¶0013, which notes that "it is difficult to predict popularity and difficult to manage pre-populating."). Sim then uses static popularity elsewhere, also *not to decide what to cache*, but rather for cache pruning – *i.e.*, to decide what to remove from a cache. *Sim*, ¶0236

Sim provides a so-called Storage Management Agent (SMA) to administer aspects of the storage system. The operation of this SMA is separate and apart from Sim's serving and associated replication process. As Sim explains, one function of the SMA is to try to maintain sufficient free space on the various storage systems.

> The Storage Management Agent ... determine[s] a reasonable storage safety threshold, adjusts the "popularity" index of a file, and identifies the least likely to be used blocks. A storage safety threshold is the minimum amount of free storage each content provider must reserve at all times. Based on storage availability and the DS activities, the Storage Management Agent determines the total amount of data to be *pruned* for each content provider and schedules the deletion of the least likely to be used blocks.

Sim ¶0199, emphasis provided.

Sim thus simply uses a "popularity index" as part of a clean-up / management process to try to ***maintain*** sufficient free space on a storage system and so to decide ***what to prune*** in a storage system ("... decides what content to prune ..." *Sim*, Abstract). The "popularity" index mentioned in Sim is not used to decide whether or not to replicate an object that is being served to a user (in Sim, as in Jungck, all replication is unconditional). As Sim states at ¶0052 (with emphasis added):

> ... the portions and amount of a large payload file *maintained* at each node depends on the available storage, popularity of the content, distribution criteria by the content provider, etc. Thus, least likely to be used blocks of a large payload file ***may be pruned*** (i.e., deleted from local storage) *to make room for other highly desirable content.*

See also *Sim* at ¶0230 which states:

> The Storage Management Subsystem watches the available shared storage, the content provider's reserved storage, and the usage logs. It initiates the removal of less popular content to make room for more popular and new content when available storage is running low.

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Sim does not, as the Examiner would have it, teach or in any way suggest "*if the requested object is popular*, replicate the requested object to the edge server."

Applicant respectfully submits that no proposed combination of Jungck with Sim, inasmuch as such a combination is even possible, would produce the invention of **claim 1**. Such a system would lack at least the <u>*conditional*</u> replication of data, wherein the replication is based, at least in part, on a <u>*dynamic* measure of popularity of the requested object</u>. Recall that in both Jungck and Sim, all replication is unconditional. Recall too that in Sim, to the extent popularity is used, it is not the popularity of the requested object. Rather, it is the popularity of other cached objects that are used to determine which of them to prune (remove) from the cache.

Furthermore, in any such combination, all content would be served from the server at which the request was originally made. This feature is contrary to the claimed requirement that "the requested object is served to the client from a server site other than the particular edge server site."

Claims 2 and 4-15 depend from claim 1 and are therefore patentable over Jungck and Sim for at least the reasons given above.

The other claims have been similarly amended, and similar arguments apply to them too.

In view of the above, withdrawal of this rejection under §103 is respectfully requested.

CONCLUSION AND REQUEST FOR PERSONAL INTERVIEW

Applicant respectfully submits that the inventions recited in the pending claims are not obvious in view of the cited references and that this application is in condition for allowance. An early action to that effect is earnestly solicited.

The Examiner is kindly requested to contact the undersigned at the number provided to schedule a personal interview to resolve any outstanding issues in this case.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0040.**

The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/ Order Nos. shown above, for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

CUSTOMER NUMBER **74958**	Respectfully submitted, By: /Brian Siritzky/37497 Brian Siritzky, Ph.D., Reg. No. 37497

DAVIDSON BERQUIST JACKSON & GOWDEY LLP
4300 WILSON BLVD., 7TH FLOOR, ARLINGTON, VIRGINIA 22203
MAIN: (703) 894-6400 ● FAX: (703) 894-6430